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A non-contact system for spatial mapping of carrier lifetimes JAMIYANAA DASHDORJ, REUBEN COLLINS, Colorado School of Mines, STEVEN JOHNSTON, BHUSHAN SOPORI, National Renewable Energy Laboratory — A novel approach to spatially resolved, non-contact, carrier lifetime mapping using resonance-coupled photoconductivity decay (RCPCD) was developed. Here, a pulsed laser excites a sample and the resulting transient is detected using a resonantly coupled antenna. The key to the present system is a patch antenna, which operates at 425 MHz and was designed using the EM simulation software, HFSS. By providing a uniform, high sensitivity detection area, the antenna only requires tuning to be performed once, after initial placement of the sample. Using this antenna, a fully computerized system has been developed for scanning samples, acquiring transients, and automatically extracting lifetimes. The present resolution is 0.25 mm, although there is no real limit on this. The new system was successfully applied to the evaluation of polycrystalline silicon wafers. In addition, effects of surface passivation on lifetime was determined. This work was supported by NREL Award # KXEA-3-33607-17.

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